

Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11) EP 0 875 901 A3

(12) EUROPEAN PATENT APPLICATION

(28) Date of publication A3  
03.11.1999 Bulletin 1999/44

(51) Int Cl.<sup>6</sup> G11C 11/15

(43) Date of publication A2:  
04.11.1998 Bulletin 1998/45

(21) Application number: 98303254.1

(22) Date of filing: 27.04.1998

(84) Designated Contracting States:  
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU  
MC NL PT SE  
Designated Extension States:  
AL LT LV MK RO SI

(71) Applicant: CANON KABUSHIKI KAISHA  
Tokyo (JP)

(72) Inventor: Nishimura, Naoki  
Ohta-ku, Tokyo (JP)

(30) Priority: 28.04.1997 JP 11103797  
28.04.1997 JP 11104097  
12.06.1997 JP 15522497  
12.06.1997 JP 15522597

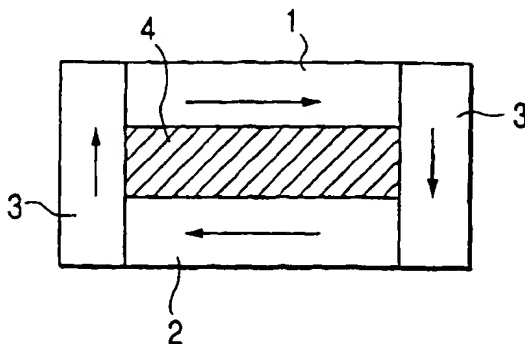
(74) Representative:  
Beresford, Keith Denis Lewis et al  
BERESFORD & Co.  
High Holborn  
2-5 Warwick Court  
London WC1R 5DJ (GB)

(54) Magnetic thin-film memory element utilizing GMR effect, and magnetic thin-film memory

(57) A magnetic memory element comprising a first magnetic layer magnetized in an orientation of magnetization along one in-plane direction, a second magnetic layer magnetized in an orientation of magnetization parallel or antiparallel to the orientation of magnetization of the first magnetic layer, the second magnetic layer hav-

ing a higher coercive force than that of the first magnetic layer, a non-magnetic layer interposed between the first magnetic layer and the second magnetic layer, and a third magnetic layer for magnetically coupling the first magnetic layer with the second magnetic layer in order to form a closed magnetic circuit with the first magnetic layer and the second magnetic layer.

FIG. 4



EP 0 875 901 A3



European Patent  
Office

## EUROPEAN SEARCH REPORT

Application Number  
EP 98 30 3254

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
1 X	WO 96 25740 A (INTEGRATED MICROTRANSDUCER ELE) 22 August 1996 (1996-08-22) * page 16, line 32 - page 18, line 12; figure 5 *	1	G11C11/15
1 X	US 5 173 873 A (WU JIIN-CHUAN ET AL) 22 December 1992 (1992-12-22) * column 4, line 11 - column 5, line 5; figures 3A,3B,3C * -----	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			G11C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 9 September 1999	Examiner Beasley-Suffolk, D
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons &amp; : member of the same patent family, corresponding document</p>			

DOCKET NO: GR 98P 2314P  
 SERIAL NO: 09/781,173  
 APPLICANT: Schwarzl et al.  
 LERNER AND GREENBERG P.A.  
 P.O. BOX 2480  
 HOLLYWOOD, FLORIDA 33022  
 TEL. (954) 925-1100